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Method for Managing Storage Space in a Storage Medium of Digital Terminal Equipment for Data Storage according to the Prioritized Pixel Transmission Method

The invention relates to [a] method for managing storage space in a storage medium of digital terminal equipment for data storage according to the prioritized pixel transmission method.

In multimedial mobile terminal equipment, such as. e.g., digital cameras, mobile telephones, etc., the available storage space is very limited. Multimedial data, such as e.g., image and video data, require a lot of storage space, which is available in mobile terminal equipment only to a very limited degree. Once the maximally available storage space has been filled, the user of the equipment must decide whether he wants to delete the old data content or refrain from storing new data. This fact shall be explained based on the example of a digital camera. Before taking a photograph, the user must adjust on the camera which image resolution the photograph is supposed to have. Modern digital cameras offer multiple picture resolutions to chose from, e.g., 640x480, 800x600 or 1024x768 image points (pixels). If the user selects a lower resolution, e.g., 640x480 pixels, more photographs can be saved to the storage medium of the camera. However, these photographs are then of a lower quality. If the user opts for a higher resolution e.g., 1024x768, only a few photographs will fit on the storage medium. If the user wants to continue taking photographs when the storage medium is full, he must first delete photographs and free storage space by converting existing photographs with a high resolution into photographs with a low resolution and saving them as such. In both cases the available storage space is not optimally used.

The explained example and its associated shortcomings are also applicable to other mobile terminal equipment, e.g., to audio and video terminals.

In EP 0 999 706 A2, a method is known for the dynamic management of a storage device for digital image data that is based on a so-called "embedded coding" of the bitstreams. In this method the image data is sorted according to the importance of the image information, in such a way that the bitstreams are coded such that the most important image information is stored first and the least important image information is stored last. When the storage medium is full, additional image information can be stored only in such a way that the least important image information of the image data that has been stored until then is deleted, so that additional storage space is freed.

A similar method is revealed in US 6 246 797 A, wherein a DCT transform or wavelet transform is used in this case for coding of the image data. If storage space is to be freed, the image information of a complete image must be re-coded in each case, which requires a relatively large amount of computing effort.

US 5 867 602 A reveals a method of coding digital data with the aid of a reversible wavelet transform. An application of this method for storage space management of a storage medium is not described.

All methods known from the prior art do not use a coding method that is based on a prioritized pixel transmission.

The object of the invention consists of specifying a method whereby the available storage space in multimedial mobile terminal equipment can be optimally used.

This object is met according to the invention with the characteristics of claim 1.

Advantageous further development and improvements of the invention will become apparent from the characteristics of the subclaims.

The inventive method has as its basis the methods for compressing and decompressing image data by means of prioritized pixel transmission, which are described in German patent applications DE 101 13 880.6 (corresponds to PCT/DE02/00987) and DE 101 52 612.1 (corresponds to PCT/DE02/00995). In these methods, digital video data, for example, is processed, which consists of an array of individual image points (pixels), wherein each pixel has a pixel value that changes with time and that describes color or brightness information of the pixel. According to the invention each pixel or each pixel group is allocated a priority and the pixels are stored in a priority array according to their priority allocation. This array contains, at each moment in time, the pixel values that have been sorted according to the priority allocation. According to this priority allocation, these pixels and the pixel values that have been used to calculate the priority allocation are transmitted and saved. A pixel receives a high priority if the differences in relation to its neighboring pixels are great. For the reconstruction process, the current pixel values in each case are reproduced on the display. The pixels that have not yet been transmitted are calculated from the pixels that have already been transmitted. These methods are independent of the image resolution used. The image resolution remains unchanged.